

CLAIMS

1. A method of carrying out an enzyme-catalysed reaction comprising  
providing a liquid reaction medium which comprises an ionic liquid including an ion which comprises a functional group selected from the group consisting of alkenyl, hydroxyl, amino, thio, carbonyl and carboxyl groups,  
providing in the liquid reaction medium an enzyme and a substrate for the enzyme,  
and allowing reaction of the substrate to occur.
2. A method according to claim 1 in which the functional group is selected from the group consisting of hydroxyl, carbonyl and carboxyl groups.
3. A method according to claim 1 in which the functional group is a hydroxyl group.
4. A method according to any preceding claim in which the functional group has a labile proton.
5. A method according to claim 5 in which the labile proton has a  $pK_a$  of less than 25, preferably a  $pK_a$  of between 10 and 20.
6. A method according to any preceding claim in which the ionic liquid comprises more than one functional group selected from the group consisting of alkenyl, hydroxyl, amino, thio, carbonyl and carboxyl groups.
7. A method according to any preceding claim in which the ionic liquid comprises either an anion and a cation or a zwitterion.
8. A method according to any preceding claim in which the ion comprising a functional group is a cation.
9. A method according to any preceding claim in which the enzyme requires a cofactor and said cofactor is provided in the liquid reaction medium.
10. A method according to any preceding claim in which the liquid reaction medium comprises less than 1.00% water,

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preferably less than 0.25% and most preferably less than 0.10%.

11. A method according to any preceding claim in which the liquid reaction medium comprises at least 99.00% of the ionic liquid, preferably at least 99.75% and most preferably at least 99.90%.

12. A method of carrying out a cofactor-dependent enzyme-catalysed reaction comprising

providing a liquid reaction medium which comprises an ionic liquid and less than 5% water,

providing in the liquid reaction medium a cofactor-dependent enzyme and the cofactor,

providing in the liquid reaction medium a substrate for the enzyme and

allowing reaction of the substrate to occur.

13. A method according to claim 12 in which the ionic liquid includes an ion which comprises a functional group selected from the group consisting of alkenyl, hydroxyl, amino, thio, carbonyl and carboxyl groups.

14. A method according to claim 13 in which the functional group is a hydroxyl group.

15. A method according to claim 12 in which the ionic liquid includes an ion which comprises a functional group which has a labile proton.

16. A method according to claim 15 in which the labile proton has a  $pK_a$  of less than 25, preferably a  $pK_a$  of between 10 and 20.

17. A method according to any of claims 12 to 16 in which the ionic liquid comprises more than one functional group selected from the group consisting of alkenyl, hydroxyl, amino, thio, carbonyl and carboxyl groups.

18. A method according to any of claims 12 to 17 in which the liquid reaction medium comprises less than 1.00% water, preferably less than 0.25% and most preferably less than 0.10%.

19. A method according to any of claims 12 to 18 in which the liquid reaction medium comprises at least 99.00% of the ionic liquid, preferably at least 99.75% and most preferably at least 99.90%.

20. A composition comprising

an ionic liquid including an ion which comprises a functional group selected from the group consisting of alkenyl, hydroxyl, amino, thio, carbonyl and carboxyl groups and

an enzyme.

21. A composition according to claim 20 in which the functional group is selected from the group consisting of hydroxyl, carbonyl and carboxyl groups.

22. A composition according to claim 21 in which the functional group is a hydroxyl group.

23. A composition according to claims 20 to 22 in which the functional group has a labile proton.

24. A composition according to claim 23 in which the labile proton has a  $pK_a$  of less than 25, preferably a  $pK_a$  of between 10 and 20.

25. A composition according to any of claims 20 to 25 which further comprises a substrate for the enzyme.

26. A composition according to any of claims 20 to 26 in which the enzyme requires a cofactor and the composition comprises said cofactor.

27. Use of a composition according to any of claims 20 to 26 to carry out an enzyme-catalysed reaction.